December 6, 2002

Subject: Amendment No. 1 to Request for Proposals (RFP) No. RDJ-3-33600 entitled "Outdoor Testing and Monitoring of Thin-Film Modules in Hot and Humid Climates"

This Amendment No. 1 to the above RFP is issued to change the scope of work to add modules to be tested. Two (2) a-Si module types from two (2) additional vendors are added. Therefore, the Statement of Work, Attachment 1 dated November 25, 2002, is revised below.

The due date and time for submittal of proposals remain unchanged.

Offerors are required to acknowledge receipt of this Amendment No. 1 with any proposals submitted in response to this solicitation.

RECEIPT ACKNOWLEDGED

COMPANY_____

NAME AND TITLE_____

DATE_____

REVISION
DATED DECEMBER 6, 2002
TO ATTACHMENT 1
RDJ-3-33600
STATEMENT OF WORK

"Outdoor Testing and Monitoring of Thin Film Modules in Hot and Humid Climates"

November 25, 2002

Section 3.0 is deleted up through Table 2 and replaced with the following:

3.0 SCOPE OF WORK AND TASKS

The scope of work under this subcontract entails the investigation of thin film module reliability outdoors under hot/humid conditions. Offeror must bid on performing this work for **all five (5) sets of modules**. The module types are expected to be as follows:

1. CdTe on glass/glass
2. CIS on glass/glass
3. CIS on a flexible substrate/flexible encapsulant (mounted on fiberglass).
4. a-Si on a flexible substrate
5. a-Si on glass/glass

Table 1. Type of Modules Expected

Technology	Sizes	Output (W)*	Voltage (V_{oc};V_{mp})*	Company
Glass/CdTe/glass	2 ft by 4 ft	50-70	90 V; 60 V	First Solar
Glass/CIS/Glass	1 ft by 4 ft	36-45	25 V; 17 V	Shell
CIS flexible, fiberglass backing	25 in by 55 in	44-48 W	100 V; 40 V	Global Solar
a-Si triple-junction on flexible substrate	~9.5 ft by 15.5 inches	64 W	23.8 V; 16.5 V	United Solar
Glass/a-Si/glass	25 in by 49 in	40-42	60 V; 44 V	Energy Photovoltaics

* Approximate ranges

For each set of module types (i.e., CIS on glass, CdTe on glass, etc.)*,* Offeror should be prepared to receive (at no cost to the Offeror) the following modules:

1. About 30 modules to be placed outdoors at maximum power using a resistive load *monitored as an even number of strings with modules wired in series to plus and minus the manufacturer's recommended maximum system voltage* (see Table 2).
   - For example, if the maximum system voltage is 600 V and it takes 24 modules to reach that, then 2 strings of 24 modules each will be set up (one to +600 V, the other to -600 V); if the maximum is 50 V and it takes 2 to reach that, then 14 strings of 2 modules each will be set up.

2. (*Optional*) Two (2) modules to be tested (from each set) in the same location for leakage current. The modules shall be set up at high voltage at opposite polarities for individual monitoring and data acquisition. Leakage current to ground shall be measured and recorded no less frequently than once per minute and averaged every 15 minutes. {Since this test can potentially introduce artifacts and degradation, final procedures will be developed with guidance from NREL.}

In addition to five (5) sets of the above-stated modules, Offeror shall be prepared to receive (at no cost): two (2) crystalline silicon modules to be placed outdoors side-by-side with the thin film modules.

*As stated above, the leakage current testing is NOT required. Every proposal **must** address the first activity – setting up CIS, a-Si, and CdTe module strings; but it is at the discretion of the Offeror whether to propose the leakage current testing. NREL makes no commitment to fund this optional activity with any Offeror, even if the rest of the proposed work is funded.*

Thus the Offeror will receive and test *about* 180 CIS, a-Si, and CdTe modules in strings (see Table 2); ten (10) optional modules for leakage current (2 of each CIS, a-Si, and CdTe kind); and two (2) crystalline silicon modules.

Table 2. Likely Approximate Recommended System Voltage for CIS, a-Si, CdTe

Technology	Recommended Maximum System Voltage*	Number of Modules to Meet Voltage Rating*	Total Number of Modules Expected*	Company
Glass/CdTe/glass	600 V	10	30	First Solar
Glass/CIS/Glass	600 V	24	50	Shell
CIS flexible, fiberglass backing	48 V	2	30	Global Solar
a-Si on flexible	600 V	24	50	United Solar
Glass/a-Si/glass	600 V	8 - 9	20	Energy Photovoltaics

* Estimated - will be finalized during negotiations

The remainder of Section 3.0, Scope of Work and Tasks, remains unchanged.